

Overview of the Vehicle Situation Data Message Exchange

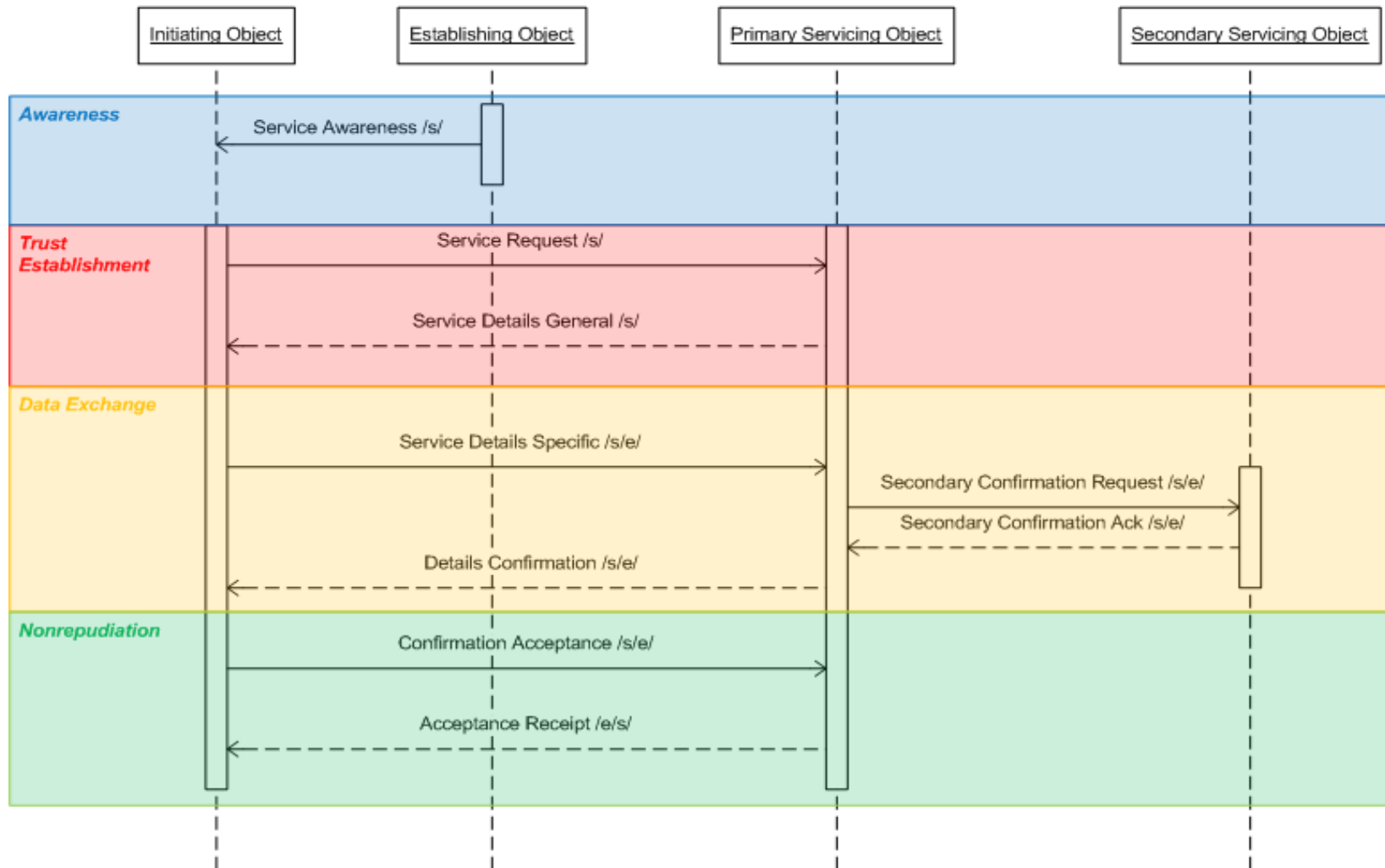
Southeast Michigan Connected Vehicle Test Bed 2014
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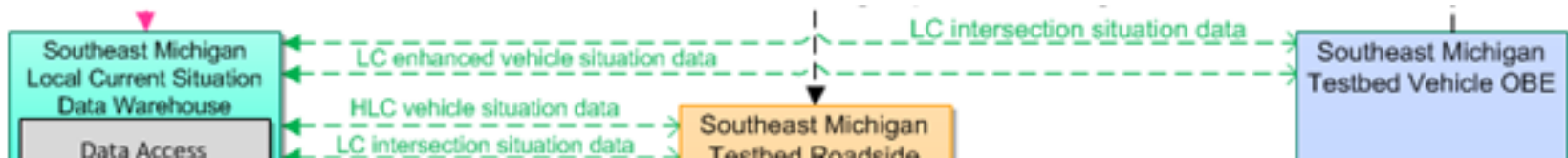
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Message Sequence Process

Phases of a Peer-to-Peer Data Exchange Message Sequence



LC enhance vehicle situation data



- Awareness
 - Object Discovery Registration and Lookup service
- Trust Establishment
 - Indication of presence from the vehicle signed by the vehicle
 - Response from data warehouse signed by the warehouse
- Data Exchange
 - Bundles of vehicle situation data sent as available
 - No response from the warehouse, best effort
- Non-Repudiation
 - Not used, best effort



Vehicle Situation Data

- Conveys vehicle status – state at a time
- Captured with BSMs every 100ms, but not broadcast as a BSM
- Stored on vehicle device in bundles
- Beginning and ending of trip obfuscated
- Transmitted to the Situation Data Warehouse using any available communication media (IP over DSCR for Test Bed vehicle devices)
- Discarded if not transmitted within a specified time limit
- J2735 Data Elements and Data Frames are used whenever possible
- New data is defined in the style of J2735



Vehicle Situation Data Records

Vehicle Situation Data Record

Data Elements		Comments
SituDataRecord 1	(--new)	
Type	(--new)	
TemporaryID	from BSM	
DDateTime		
Position3D		
TransmissionAndSpeed	from BSM	
Heading	from BSM	
SteeringWheelAngle	from BSM	
AccelerationSet4Way	from BSM	
BrakeSystemStatus	from BSM	
VehicleSize	from BSM	
VehicleStatus	(Optional)	
Weather	(Optional) (--new)	
Environmental	(Optional) (--new)	
ElectricVeh	(Optional) (--new)	

Type:

- Indicates the type of data contained in the record

Fundamental Data:

- Included with every record
- Captured when BSM is captured
- Includes data from the BSM Part I

Vehicle Status Data:

- J2735 VehicleStatus plus additional data
- Included only when available
- Captured when BSM is captured

Weather Data:

- J2735 "Weather" data elements plus additional data (user/app specific)
- Included only when available
- Captured when BSM is captured

Environmental & ElectricVeh Data:

- New data (user/app specific)
- Included only when available
- Captured when BSM is captured



Vehicle Situation Data Message

Vehicle Situation Data Message			
Data Elements		Comments	
VehSitMsg	msgID	<new ID>	Part I, Region\Time Context
	PathHistory		
	PathHist	FullPositionVector	
		Count	
		PathHistoryPointType-04	
	Bundle	(--new)	Part II, Situation Data Bundle
	Bundle	SituDataRecord 1	
		Type	
		TemporaryID	
		DDateTime	
		Position3D	
		TransmissionAndSpeed	
		Heading	
		SteeringWheelAngle	
		AccelerationSet4Way	
		BrakeSystemStatus	
		VehicleSize	
		VehicleStatus	
		Weather	
		Environmental	
		ElectricVeh	
		SituDataRecord 2	
		SituDataRecord 3	
		:	
		SituDataRecord N	

- Vehicle Situation Data Messages contain a PathHistory data frame followed by a “Bundle” data frame containing several Vehicle Situation Data Records.
- Messages are ASN.1 encoded, per J2735
- Messages are signed and encrypted using 1609.2 credentials
- Specific security credentials are required to deposit messages in the Situation Data Warehouse
- More details regarding the content of data records and messages will be discussed in the Peer-to-Peer breakout session

